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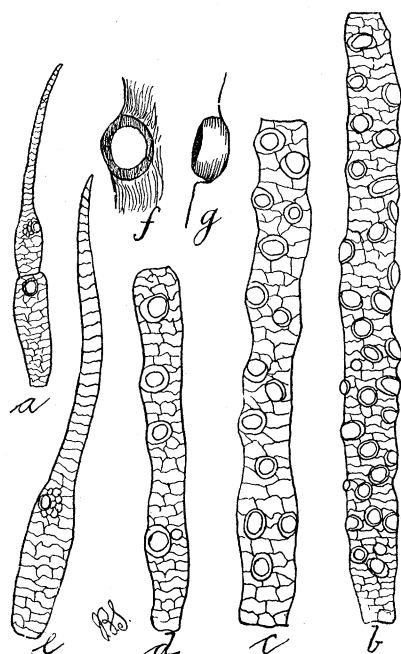
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AN INTERESTING SENSORY ORGAN IN CERTAIN PLANT LICE.

BY JOHN B. SMITH, SC D., RUTGERS COLLEGE.

DURING the season of 1890 plant-lice were unusually abundant and destructive on a number of cultivated crops in New Jersey, and I devoted some little time to the study of the more troublesome species, presenting the results, in popular form, in Bulletin No. 72 of the New Jersey Agricultural College Experiment Station. One of the matters that attracted my attention more particularly was the peculiar pitting of the antennæ. These pits and tubercles, as they have been indifferently called, are well known; but they have been often treated as merely sculptural features, and no special importance has been attributed to them. In my examinations of the structures I recognized them as sensory in character; but was not then and am not now able to specify their exact function, since they differ from what are usually described as the tactile and olfactory organs. The appended figure, showing the pittings of the antenna of the peach-louse, will serve to illustrate the appearance of the structures.



PEACH LOUSE:—*a*, Antenna of young louse; *b*, First long joint of winged form; *c*, Second long joint; *d*, Third long joint; *e*, Whip-joint; *f*, Sensory pit of antenna, from top; *g*, Same, from side.

I found that in all the wingless forms of all the species examined by me one type only was present. There is a single large pit, surrounded by a little group of small pits, on the last or whip-joint and, usually, a single large pit near the tip of the penultimate segment. This structure never changes in character while the insect remains wingless, whether it is newly-born or has reached a point where it reproduces its kind agamically. It continues also throughout the pupa state; but as soon as the winged form is assumed a very decided change appears, and every species shows a pitting peculiar to it. It may involve all the joints or only one may be modified; but, whatever the type, it is invariable within specific limits, and I have not found thus far any two species in which the pitting is identical. It may be that where a species is dimorphic, or where there are migratory and sedentary forms, that each form may have peculiarities of structure; but this I do not know.

At the time I made the studies above mentioned, I had neither males nor oviparous females of any species before me, and not until the fall of 1892 was I in position to examine sexed individuals carefully. I was curious to find whether any further modifications appeared in the true sexes, and whether the wingless, oviparous females shared in the larval type of structure. I obtained males and females of *Aphis brassicæ*, *Siphonophora cucurbitæ*, *S. rosæ*, *Myzus cerasi*, and *Phorodon humuli*. In the males

of all, as I expected, I found the antennal pittings present, and was not unprepared to find that they differed from the viviparous winged forms in their somewhat greater number and distinctness. I was disappointed to find in the oviparous female no modification of the simple larval type; but, as I was in search of some character that would always distinguish this particular form without recourse to the primary sexual structures, I examined all parts of the insects minutely, and was rewarded by finding on the posterior tibiæ a series of sensory pittings exactly similar in structure to those of the antennæ in the male. I found that these structures differed in each of the species examined, in size, arrangement, and number, and the character is probably as little variable here as it is in the antenna. *Myzus cerasi* was the only species in which I had any number of specimens for examination, and in this I found that the tibial pitting does not appear until the insect becomes sexually mature.

To ascertain whether other species showed the same structure, I wrote Dr. C. V. Riley, asking whether he had observed it or could inform me as to its presence or absence in other species. Recently he very kindly replied as follows: "I have not yet been able to examine all the material at hand, but I can say that I have verified your interesting discovery in the following species: The pits are present in *Aphis mali*, *A. pruni*, *Myzus nahaleb*, *Siphonophora rosæ*, *Siphonophora sp.* on rose, *Callipterus sp.* on oak, in *Phyllaphis fagi*, and in *Melanoxanthus salicis*. I do not find them present in the following genera: *Schizoneura*, *Glyphina*, *Pemphigus*, and *Phylloxera*, while in *Lachnus* they are not at all well developed or distinctly observable. This list, so far as it goes, would, therefore, show that they occur in what may be looked upon as the higher forms, and are absent in the *Pemphiginae* and *Phylloxerinae*."

I have not seen any mention of the structures above described, and am less than ever able to attribute a function to them. Finally, I desire to express my obligation to Dr. Riley, who not only examined the species mentioned in his letter, but also sent me the sexed specimens on which my studies were first made.

THE INDIANA ACADEMY OF SCIENCE.

THE eighth annual meeting of the Indiana Academy of Science convened in the rooms of the State Board of Agriculture, Capitol Building, Indianapolis, Ind., Dec. 28, 1892, and continued through the 29th. The president was Professor J. L. Campbell of Wabash College, Crawfordsville, Ind. The meeting was one of universal interest. The attendance was large; the list of papers showed 92 titles, almost all of which were read.

The officers chosen for the year were: President, J. C. Arthur, Purdue University, Lafayette, Ind.; vice-president, W. A. Noyes, Rose Polytechnic Institute, Terre Haute, Ind.; secretary, Amos W. Butler, Brookville, Ind.; assistant secretary, Stanley Coulter, Purdue University, Lafayette, Ind.; treasurer, C. A. Waldo, DePauw University, Greencastle, Ind.; auditors, Thomas Gray, Rose Polytechnic Institute, Terre Haute, Ind.; W. S. Blatchley, High School, Terre Haute, Ind.; programme committee, L. M. Underwood, DePauw University, Greencastle, Ind.; W. A. Noyes, Rose Polytechnic Institute, Terre Haute, Ind.

The arrangements for the spring meeting the third week in May contemplate a two days' session in the picturesque and interesting region in Park County, closing with a session Friday evening at Terre Haute.

The editors presented their report and also the first volume of the Academy's Proceedings ready for distribution. The volume contains the papers of the last preceding meeting together with an account of the field meetings, a bibliography of all papers read before the Academy since its organization in 1885, together with reference to the place of publication of each.

The following papers were presented:—

Notes on the Reproduction and Development of *Grinnellia Americana* Harv., M. A. Brannon; Evidences of Man's Early Existence in Indiana, from the Oldest River Gravels along the White Water River, A. W. Butler; On the Construction of a Sensitive Galvanometer, Benj. W. Snow; Some Facts as to the Varying Conditions of Rock Deposits as Observed in the Hudson River

Beds of Indiana and an Inquiry as to the Cause of the Same, Joseph Moore; A Simple Air Thermometer for the Determination of High Temperatures, W. A. Noyes; Test of the Torsional Strength of a Steel Shaft, Thomas Gray; An Extreme Case of Parasitism, Robert Hessler; Exhibition and Explanation of a Geological Chart, Elwood P. Cubberly; Local Variations, C. H. Eigenmann; Botanical Field-Work in Western Idaho, D. T. MacDougal.

When this stage on the programme was reached, the hour for noon adjournment arrived. It was then decided to meet in three sections in the afternoon, in order to accommodate members who were present with papers. The next morning, it was understood, the general sessions would be resumed. The three sections organized were, A, mathematics, physics, chemistry, and geology; B, botany; C, zoölogy and anthropology. In them the following papers were presented:—

The Quaternion Treatment of the Motion of Two or More Bodies under the Law of Gravitation, A. S. Hathaway; The Electrical Oxidation of Glycerin, W. E. Stone and H. N. McCoy; Notes Concerning Tests of the Purdue Experimental Locomotive, W. F. M. Goss; The Electrostatic Theory of Cohesion and Van der Waal's Equation, Reginald A. Fessenden; On Sulphon-Pthaleins, Walter Jones; Quartz Suspensions, Benj. W. Snow; Observations on Glacial and Pre-Glacial Erosion at Richmond, Indiana, Joseph Moore; A Modification of Grandea's Method for Determination of Humus in Soils, H. A. Huston and F. W. McBride; Experiments with and Phenomena of Vacuum Tubes, R. A. Fessenden; The Extraction of Xylan from Straw in the Manufacture of Paper, W. E. Stone and W. H. Test; The Electro-Magnetic Inertia of a Large Magnet, Thomas Gray; The Determination of Chlorine in Natural Waters, W. A. Noyes; Some New Electrical Apparatus, R. A. Fessenden; Thiofurfural and its Condensation Products, W. E. Stone and Clinton Dickson; On the Construction and Use of a Bolometer, B. W. Snow; On the Determination of Valence, P. S. Baker; An Application of Mathematics in Botany, Katharine E. Golden; On the Fertilization and Development of the Embryo in *Senecio aureus*, D. M. Mottier; Distribution of North American Cactaceæ (by title), John M. Coulter; *Marchantia polymorpha*, not a Typical or Representative Liverwort, L. M. Underwood; Notes Concerning Certain Plants of the South-Western Counties of Indiana, John S. Wright; Spines and Epidermis of the Cactaceæ (by title), E. B. Uline; Preliminary Notes on the Genus Cactus, E. M. Fisher; An Auxanometer for the Registration of Growth of Stems in Thickness, Katharine E. Golden; The Apical Growth of the Thallus of *Fucus vesiculosus*, D. M. Mottier; Symbiosis in Orchidaceæ, M. B. Thomas; Notes on Pedicel, W. L. Bray; The Genus *Corallorhiza*, M. B. Thomas; Notes on Root Tubercles of Indigenous and Exogenous Legumes in Virgin Soil of the North West (by title), H. L. Bolley; Notes on Archaeology in Mexico, J. T. Scovell; Notes on the Loss of the Vomerine Teeth with Age in the Males of the Salamander, *Desmognathus fusca* (by title), F. C. Test; Modern Geographical Distribution of Insects in Indiana (by title), F. M. Webster; New Species of Indiana Hymenoptera, reared at LaFayette, Indiana (by title), F. M. Webster; Description and Elevation of Mount Orizaba, J. T. Scovell; The Climate and Glaciers of Mounts Orizaba and Popocatepetl, J. T. Scovell; A Mite, probably *Hypoderas columbae*, Parasitic in the Pigeon, W. W. Norman; The Locustidæ of Indiana with Description of New Species, W. S. Blatchley; Early Stages in the Development of *Cymatogaster*, C. H. Eigenmann; Some Remarks Regarding the Embryology of *Amphiuma*, O. P. Hay; Some Structural Peculiarities of Pacific Slope Fishes (by title), A. B. Ulrey; Peculiar Death of an Oriole (by title), T. B. Redding; The Range of the American Crossbill (*Loxia curvirostra minor*) in the Ohio Valley, with Notes on its Unusual Occurrence in Summer, A. W. Butler; A Note on *Loxia curvirostra*, W. S. Blatchley; Notice of a Terrapin to be Restored to the Fauna of Indiana, O. P. Hay; A Migration of Birds and One of Insects, T. B. Redding; The South American Catfishes Belonging to Cornell University (by title), E. M. Kindle; Notes on the Genus *Lytta*, W. P. Shannon; The Ichthyologic Features of the Black Hills Region, B. W. Evermann; Explorations in Western Canada, C. H. Eigenmann.

In the evening the Academy convened to listen to the address of President Campbell on "The Inter-Dependence of Liberal Pursuits."

At the general Session of the second day the following papers were presented:—

Ancient Earthworks near Anderson, Indiana, Francis A. Walker; The Work of the U. S. Fish Commission Steamer Albatross, in the North Pacific and Behring Sea in 1892, B. W. Evermann; A Thermo Regulator for Rooms Heated by Steam, J. C. Arthur; Archæology of Tippecanoe County, O. J. Craig; Some Indian Camping Sites near Brookville, A. W. Butler; Relation of Kings County Traps to Those of Cumberland County, N.S., V. F. Marsters; The Traps of Red Head, N.B., V. F. Marsters; On Birds in Western Texas and Southern New Mexico (by title), A. W. Butler; An Account of Vegetable and Mineral Substances that Fell in a Snow-Storm in LaPorte County, Jan. 8-9, 1892 (by title), A. N. Somers; How a Tendril Coils, D. T. MacDougal; Remarkable Pre-Historic Relic, E. Pleas; The Bruns' Group of Mounds, H. M. Stoops; Some Points in the Geology of Mount Orizaba (by title), J. T. Scovell; Two-Ocean Pass (by title), B. W. Evermann; The Blattidæ and Phasmidæ of Indiana, W. S. Blatchley; Forestry Exhibit of Indiana at the Columbian Exposition, Stanley Coulter; The Yolk Nucleus, J. W. Hubbard; Some Causes Acting Physiologically toward the Destruction of Trees in Cities, J. C. Arthur; British Columbia Glaciers, C. H. Eigenmann; A State Biological Survey—A Suggestion for Our Spring Meeting, L. M. Underwood; The Mounds of Brookville Township, Franklin County, Ind., H. M. Stoops; How the Colleges Could Aid the Public Schools in Teaching Biological Subjects, W. W. Norman; Notes on the Flora of the Chilhowee and Great Smoky Mountains, Stanley Coulter; The Need of a Large Library of Reference in Cryptogamic Botany in Indiana, What the Colleges Are Doing to Supply the Deficiency, L. M. Underwood; Exhibition of a Series of Grouse and Ptarmigan from Alaska, B. W. Evermann; Botanical Assemblies in the United States Announced for the Year 1893, J. C. Arthur; Development of Ovule in Aster and Solidago (by title), G. W. Martin; Remarks on Archæological Map-Making (by title), A. W. Butler; The "Lilly Herbarium" and Its Work, John S. Wright; Additional Facts Regarding Forest Distribution in Indiana, Stanley Coulter; Rotary Blowers, John T. Wilkin; Some Effects of Mutilation on the Forms of Leaf and Sex of *Morus alba* and *Morus nigra* (by title), A. N. Somers; The Crawford Mound (by title), H. M. Stoops.

LIFE-SAVING.

BY DELOS FALL, ALBION, MICH.

SANITARIANS are in the habit frequently of advancing claims in regard to the practical value of their work, resulting, they say, in a great lessening of sickness and the actual saving of many lives. For example, in a carefully prepared paper, read before the Sanitary Convention at Vicksburg, Dr. Baker, secretary of the Michigan State Board of Health, gave official statistics and evidence, which he summarized as follows:—

"The record of the great saving of human life and health in Michigan in recent years is one to which, it seems to me, the State and local boards of health in Michigan can justly 'point with pride.' It is a record of the saving of over one hundred lives per year from small-pox, four hundred lives per year saved from death by scarlet-fever, and nearly six hundred lives per year saved from death by diphtheria—an aggregate of eleven hundred lives per year, or three lives per day saved from these three diseases! This is a record which we ask to have examined, and which we are willing to have compared with that of the man who 'made two blades of grass grow where only one grew before.'"

It has occurred to the writer that even scientific workers look upon such statements with a large degree of allowance. They can be demonstrated, however, as the following will illustrate: The table below is compiled from reports of local health officers to the secretary of the State Board of Health relative to the cases of sickness and deaths from diphtheria in Michigan during